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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,094	12/07/2001	Suk Won Choi	8733.500.00	8570

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MCKENNA LONG & ALDRIDGE LLP  
1900 K STREET, NW  
WASHINGTON, DC 20006

EXAMINER

SMOOT, STEPHEN W

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/005,094

Applicant(s)

CHOI ET AL.

Examiner

Stephen W. Smoot

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

This Office action is in response to applicant's amendment filed on 01 August 2003.

### ***Drawings***

1. The replacement sheet corresponding to Fig. 8 was received on 01 August 2003. This drawing is acceptable and has been substituted for the originally filed Fig. 8.

### ***Claim Objections***

2. Claims 1, 19, 25 are objected to because of the following informalities:  
In claim 1, line 9, change "an uniform" to --a uniform-- to correct spelling;  
In claim 19, line 8, change "an uniform" to --a uniform-- to correct spelling; and  
In claim 25, line 2, change "ranged" to --range-- to correct spelling.  
Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The rejection to claim 3 under 35 U.S.C. 112, second paragraph, is hereby withdrawn based on the applicant's amendment to the claim to provide proper antecedence.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-10, 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. in view of Yamazaki et al. (it is noted that these prior art references have been provided to the applicant in a prior Office action – see Paper No. 4).

Referring to Fig. 6, column 7, lines 10-51, and column 9, lines 3-10, Miyazaki et al. disclose a ferroelectric liquid crystal cell with the following structural features:

- Two opposing glass substrates (1a, 1b) are provided;
- Transparent ITO electrodes (2a, 2b) are formed on the glass substrates (1a, 1b);
- Alignment films (4a, 4b) are formed over the electrodes (2a, 2b);

- The alignment films (4a, 4b) are rubbed;
- The two substrates (1a, 1b) are attached to each other using spacers to form a cell;
- The cell is filled with a mixture containing a ferroelectric liquid crystal stabilized in a polymer network (see column 5, lines 23-35); and
- The ferroelectric liquid crystal exhibits a chiral smectic C phase with an appropriate orientation state.

These are limitations set forth in claims 1, 19 of the applicant's invention.

However, Miyazaki et al. do not expressly teach or suggest a pixel electrode (a limitation of claim 1) nor a TFT array layer (a limitation of claim 19).

Referring to Figs. 2(B), Yamazaki et al. disclose a liquid crystal cell that has a TFT active matrix (117) formed on one of the opposing glass substrates (116) that includes an ITO pixel electrode (113) (see column 7, lines 41-50).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Miyazaki et al. and Yamazaki et al. in order to form TFTs as taught by Yamazaki et al. on one of the substrates of Miyazaki et al. using the ITO electrodes as pixel electrodes. Yamazaki et al. recognize that TFTs can be used to control the cell images of liquid crystal displays and in such applications the transparent ITO pixel electrodes can be used to address these individual TFTs (see column 8, lines 1-8).

Regarding claims 2-10, 20-28, these are product-by-process claims and the patentability of a product does not depend on its method of production (see MPEP

section 2113). The burden now shifts to the applicant to show that claims 2-10, 20-28 have an unobvious structural difference to claims 1, 19 as rejected above.

Regarding the mono-domain alignment limitation of claim 29, this property is presumed to be inherent since the combined structure of Miyazaki et al. and Yamazaki et al. is substantially identical to the applicant's claimed structure (see MPEP section 2112.01). The burden now shifts to the applicant to show that these structures are not identical.

6. Claims 11, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. in view of Yamazaki et al. and as evidenced by Wolf and Tauber (it is noted that these prior art references have been provided to the applicant in a prior Office action – see Paper No. 4).

Referring to Fig. 6, column 7, lines 10-51, and column 9, lines 3-10, Miyazaki et al. disclose a method of manufacturing a ferroelectric liquid crystal cell with the following features:

- Two opposing glass substrates (1a, 1b) are provided;
- Transparent ITO electrodes (2a, 2b) are formed on the glass substrates (1a, 1b);
- Alignment films (4a, 4b) are formed over the electrodes (2a, 2b);
- The alignment films (4a, 4b) are rubbed;
- The two substrates (1a, 1b) are attached to each other using spacers to form a cell;

- A mixture containing a ferroelectric liquid crystal and a photopolymerizable monomer is injected between the alignment films (4a, 4b);
- The liquid crystal cell is heated until the mixture becomes an isotropic liquid;
- The mixture is then cooled until the liquid crystal material exhibits a chiral smectic C phase;
- Then the photopolymerizable monomer is photopolymerized by irradiating with ultraviolet light to form a polymer; and
- Preferably, the photopolymerization step is performed at a temperature corresponding to an appropriate orientation state, which is not likely to be subsequently disturbed.

These are limitations set forth in claims 11, 14 of the applicant's invention. Regarding the mercury or xenon lamp as the light source limitation of claim 17 and the 365 nm wavelength range limitation of claim 18, the disclosure of Wolf and Tauber shows that mercury arc lamps have characteristic wavelengths in the ultraviolet range including the i-line wavelength of 365 nm (see Fig. 13-45).

However, although Miyazaki et al. teach the formation of transparent ITO electrodes on both glass substrates, they do not expressly teach or suggest a pixel electrode formed on one of these substrates, which is a limitation of claim 11 of the applicant's invention.

Referring to Figs. 2(B), Yamazaki et al. disclose a liquid crystal cell that has a TFT active matrix (117) formed on one of the opposing glass substrates (116) that includes an ITO pixel electrode (113) (see column 7, lines 41-50).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Miyazaki et al. and Yamazaki et al. in order to form TFTs as taught by Yamazaki et al. on one of the substrates of Miyazaki et al. using the ITO electrodes as pixel electrodes. Yamazaki et al. recognize that TFTs can be used to control the cell images of liquid crystal displays and in such applications the transparent ITO pixel electrodes can be used to address these individual TFTs (see column 8, lines 1-8).

Regarding claims 15-16, Miyazaki et al. teach a 1 minute to 20 minutes exposure for the photopolymerization step (see column 7, lines 49-51) and in one example irradiate with ultraviolet light at  $14 \text{ mW/cm}^2$  (see column 9, lines 18-20). It would have been obvious at the time the invention was made to adjust the light intensity to fall within the claimed range of 1 to  $5 \text{ mW/cm}^2$  (claim 15) for a duration of time corresponding to a total exposure energy that ranges from 240 to  $1200 \text{ mJ/cm}^2$  (claim 16), unless the applicant can show that these claimed ranges achieve unexpected results relative to the prior art examples of Miyazaki et al., since it has been held that claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art [see *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990) and also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)].

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. and Yamazaki et al. as applied to claim 11 above, and further in view of Lee et al.



(it is noted that these prior art references have been provided to the applicant in a prior Office action – see Paper No. 4).

As shown above the combined teachings of Miyazaki et al. and Yamazaki et al. have all of the limitations set forth in claim 11 of the applicant's invention. However, neither Miyazaki et al. nor Yamazaki et al. teach or suggest injecting the ferroelectric liquid crystal at a temperature that is above the smectic/nematic phase transition temperature of the liquid crystal, which is the further limitation to claim 11 set forth in claim 12 of the applicant's invention. Lee et al. teach the injection of a liquid crystal and polymer mixture at a temperature around the isotropic phase transition temperature of the liquid crystal (see column 4, lines 13-48).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Miyazaki et al. and Yamazaki et al. by injecting the ferroelectric liquid crystal and photopolymerizable monomer mixture after the liquid crystal cell of Miyazaki et al. has been heated above the isotropic phase temperature of the ferroelectric liquid crystal. Lee et al. recognize that injecting the mixture at higher temperatures has the advantage of preventing separation of the mixture due to viscosity differences (see column 4, lines 14-18).

8. Claims 13, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki et al. and Yamazaki et al. as applied to claim 11 above, and further in view of H. Furue et al. (it is noted that these prior art references have been provided to the applicant in a prior Office action – see Paper No. 4).

As shown above the combined teachings of Miyazaki et al. and Yamazaki et al. have all of the limitations set forth in claim 11 of the applicant's invention. Also, Miyazaki et al. teach that the polymer stabilizes the orientation state of the ferroelectric liquid crystal (see column 5, lines 23-35 and column 7, lines 42-46), which is the further limitation to claim 13 set forth in claim 30 of the applicant's invention. However, neither Miyazaki et al. nor Yamazaki et al. teach or suggest applying a direct current to the ITO electrodes when the ferroelectric liquid crystal is uniformly aligned, which is the further limitation to claim 11 set forth in claim 13 of the applicant's invention. H. Furue et al. teach the curing of a monomer mixed with a ferroelectric liquid crystal by simultaneously applying ultraviolet light and a voltage of 4 volts (see Experiment section).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Miyazaki et al. and Yamazaki et al. by curing the monomer of Miyazaki et al. through the simultaneous application of ultraviolet light and voltage during the curing step. H. Furue et al. recognize that their curing method has the advantage of improved electrooptical properties for ferroelectric liquid crystal displays (see Introduction section).

Regarding the mono-domain alignment limitation of claim 31, this property is presumed to be inherent since the combined process of Miyazaki et al., Yamazaki et al., and H. Furue et al. is substantially identical to the applicant's claimed process (see MPEP section 2112.01). The burden now shifts to the applicant to show that these processes are not identical.

***Response to Arguments***

9. Applicant's arguments with respect to claims 1-31 have been considered but are moot in view of the new grounds of rejection.

***Conclusion***

10. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

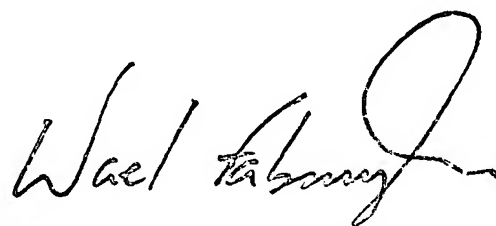
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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 703-305-0168. The examiner can normally be reached on M-F (8:00am to 4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

SWS

A handwritten signature in black ink, appearing to read "Wael Labadie", with a large, stylized loop at the end.

SUPERVISORY PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800